Joint Urgent Operational Needs (JUON) Challenge Areas

1. **Stand-Off Detection and Confirmation of Explosives.** The Department of Defense (DoD) seeks capabilities to rapidly and accurately determine the presence of explosives from safe distances. This must be accomplished with a high probability of detection and a low probability of false alarms in an environment that is contaminated with explosives and potential pre-cursors. Capabilities are required for a wide variety of situations, including but not limited to the following: person and vehicle borne Improvised Explosive Devices (IEDs) in complex environments such as marketplaces; buried or hidden IEDs; and IED assembly and/or explosives production facilities. Ideal solutions should encompass determination of all types of potential explosives, both in the detection and confirmation mode. However, the following types are of particular interest: bulk home-made explosives and enclosed or hidden military-grade explosives. In general, detection capability should provide wide area scanning capability and a preliminary indication of where the confirmation sensor should interrogate. The Department seeks technology capabilities and "systems-of-systems" that will markedly improve the capability to determine IEDs and/or homemade explosives from safe distances.

2. **Stand-Off Detection of Person-Borne and Vehicle-Borne IEDs.** The challenge in traditional methods of Person-Borne IED (PBIED) and Vehicle- Borne detection (VBIED) and verification is that it requires fast, multimodal, surreptitious interrogation of each individual and/or vehicle in a moving, unstructured crowd (e.g., in a market square) or traffic from a stand-off distance. Vendors should assume the operational environment is permissive, and the crowds and vehicles are uncooperative. "Stand-off" means the operator is able to perform PBIED/VBIED detection and verification at a distance that substantially mitigates personnel and operational risk should the PBIED/VBIED detonate. The stand-off distance will vary depending on the scenario. DoD seeks components and 'system-of-systems' technologies that will measurably improve DoD's capability to detect PBIEDs or VBIEDs. Proposals can include, for example, multiple sensing modalities, specific and general fusion algorithms, and user-friendly displays.

3. **Buried IED and Pressure Initiation Device Requirements.** The most common initiators for buried IEDs are pressure switches and command wires. DoD requires improved methods for detecting these threats. Buried IEDs and pressure initiation devices are emplaced on or under the ground with the intent to detonate them beneath vehicles and personnel. They are used on roadways, thoroughfares and choke points where intended victims are likely to pass over. Emplacements vary widely, but burial depth often corresponds with the net explosive weight of the device (i.e. larger devices will be emplaced more deeply or in culverts). The explosive charge can be composed of: metallic ordnance, low metal mines or bulk explosives in metal, plastic or fabric containers. Devices are frequently emplaced in or near features that screen their signatures and channel traffic over them such as washouts, culverts, curves and choke points.

4. **Force Protection During Dismounted Operations.** DoD seeks technologies to find, clear and/or defeat victim operated IEDs (VOIEDs), and to better protect service-members from blast effects and traumatic brain injuries during dismounted operations. Improvements are necessary to permit freedom of maneuver over an area of interest or route and eliminate the

effects of all forms of IEDs used against friendly forces and non-combatants. The Department seeks lightweight detection devices that can aid service members operating on foot to spot and/or avoid VOIEDs. Additionally, the Department seeks protective gear, such as helmets and personal protective clothing that will reduce the risk of casualty/injury due to blast.

5. **Improved Armor Protection.** There is a continuing need to develop lightweight armor solutions for vehicles (transparent and opaque) that are significantly lighter than current expedient designs. These improvements are to protect against anti-armor IED threats and for integration into Mine Resistant Ambush Protected (MRAP) systems and the Medium Mine Protected Vehicles (MMPV).

6. **Enhanced Intelligence, Surveillance, and Reconnaissance (ISR) Capabilities.** DoD is interested in improving its airborne ISR capabilities to better operate during inclement weather conditions (e.g., low visibility, wind, sand storms, rain, icing, etc.) and provide persistent, reliable and effective near real time imagery while remaining virtually undetected. The Department seeks sensors and platform technology capabilities and "systems-of-systems" that will markedly improve the capability to provide imagery and tracking of vehicles and personnel while remaining unobserved by the targeted object.

7. **Explosively Formed Penetrator Requirements.** An explosively formed penetrator (EFP) is a class of IED designed to fire a shaped warhead that effectively penetrates armor at stand-off distances. An EFP system has four major components: Arming Switch, Trigger Switch, Explosive Device, and Camouflage. The requirement is to detect an EFP system from a moving vehicle while performing route clearance operations. Detection of the EFP must occur in time to provide a safe stand-off-distance for the vehicle's crew to react. Goal is to detect multiple EFP components to increase the probability of detection and reduce the false alarm rate.

8. **Deep Buried IED Requirements.** Deep Buried IED (DBIED) is a class of IEDs that are buried below the surface with a large quantity of explosives (sufficient weight to destroy an armored military vehicle). A DBIED system typically comprises three major components: an arming device, a trigger device and the explosive device. Needed is the ability to detect emplaced DBIEDs with a high probability of detection and a low false alarm rate, and alert operating forces in sufficient time to remain outside the blast zone of the explosive device.

9. **Blasting Cap Detect and Defeat.** Develop a single-vehicle system capable of detecting and neutralizing blasting caps commonly used in IEDs at a distance. The stand-off capability for detection and neutralization affords personnel adequate reaction time to an identified threat relative to vehicle speed before the vehicle is in the blast seat. System shall be able to detect and engage multiple threats simultaneously. The system will incorporate both visual and audio alerts for the system user. Visual and audio alerts must be able to be used with Personal Protective Equipment while riding in the vehicle. False positive alarm rates must be held to a minimal amount.

10. **Command Wire Detect and Defeat.** Develop a vehicle-mounted system to simultaneously detect and neutralize Command Wire triggered IEDs from operationally safe standoff

distances. The system shall rapidly detect command wire, and be able to neutralize the IED system by effectively disrupting electric initiators or inducing a high order detonation of the IED. Detection equipment shall provide geo-spatial location of the IED. The system shall also be able to confirm neutralization and incorporate both visual and audio alerts for the system user. False positive alarm rates must be held to a minimal amount, and the system must distinguish between the threat and the environment.

11. **Other Counter-IED and Force Protection Proposals.** Offerors possessing any additional technology, information, or recommendations that would enhance the detection, identification defeat of IEDs or improve the protection of friendly forces from death or injuries in combat areas are also encouraged to submit proposals to this BAA.